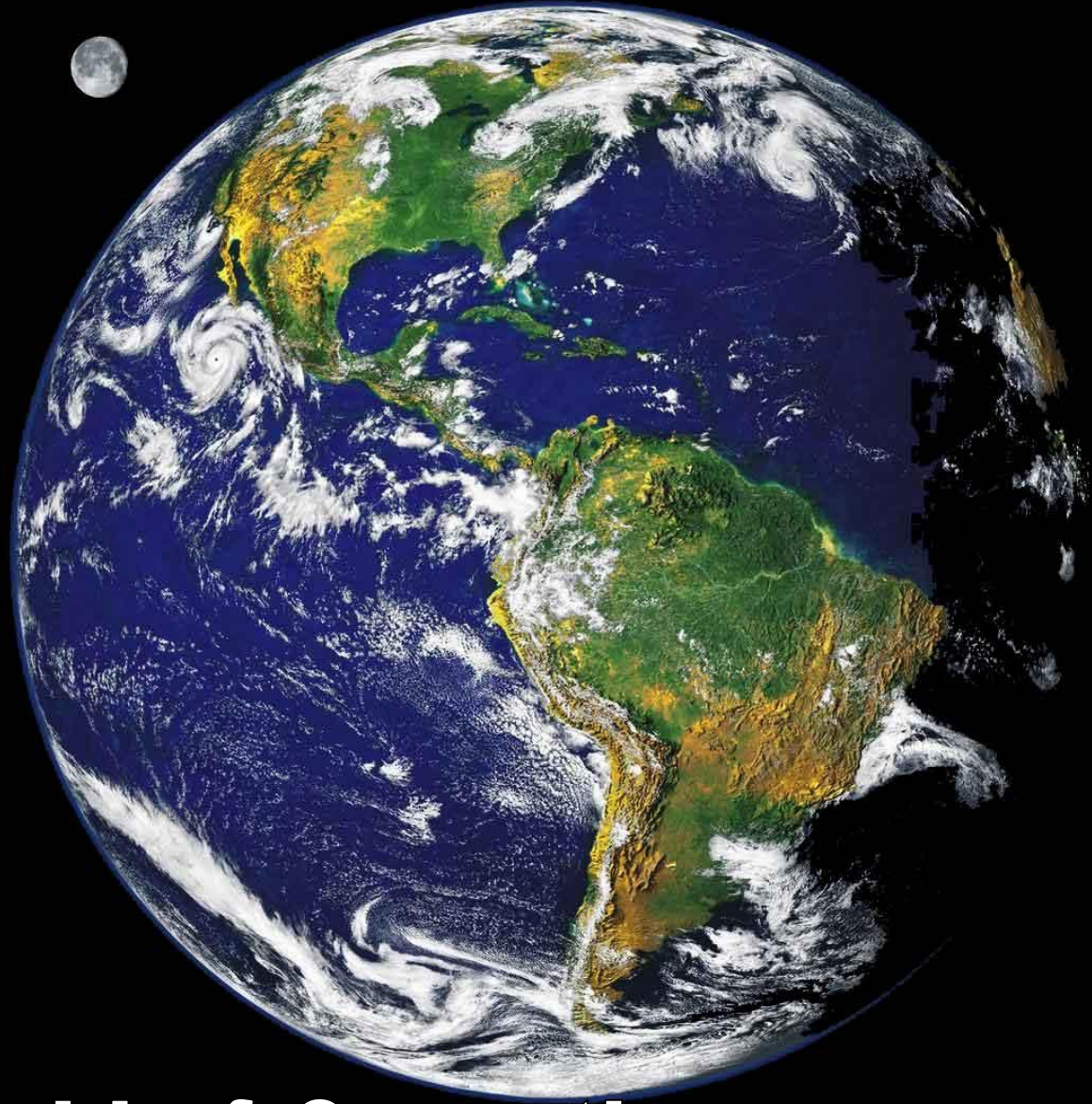


DoD's Environmental Stewardship

A Regulator's View



DoD's Field of Operations

Is DoD a Leader in Environmental Stewardship?

- Global mission
- Enormous landholdings
- Faced with virtually every conceivable environmental issue
 - Global warming to snail darters
 - Land use, water scarcity, overpopulation
 - Invasive species, resource depletion, famine
 - Disease, emerging contaminants, etc., etc.

- Effective command and control structure
- Huge budgets
- Forward thinking
- Governmental agency with legal responsibilities
- Technically sophisticated
- Practical necessity to understand environmental issues

PFOS & PFOA

Impact on Wurtsmith AFB
Remedial Program



Fire Training Area Soils



Terminology

- Perfluorooctane Sulfonate (PFOS)
- Perfluorooctanoic Acid (PFOA)
- Perfluorinated or Perfluoroalkyl Chemicals (PFCs)
- Long Chain PFCs
- Precursors of PFOS and PFOA



PFCs

- Extremely toxic to lab animals
- Bio-accumulate and bio-augment up the food chain
- Virtually indestructible in nature
- Widespread contamination

\\V:\PROJECTS\AIR\30814\30814-Total_PFCs.dwg 1/12/2015 2:21:41 PM DWTLE COASTAL SITE.A



TOTAL PFCs IN GROUNDWATER ANALYTICAL RESULTS
DIRECT PUSH POINT AND MONITOR WELL LOCATIONS
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WURTSMITH AIR FORCE BASE
OSCODA, MICHIGAN

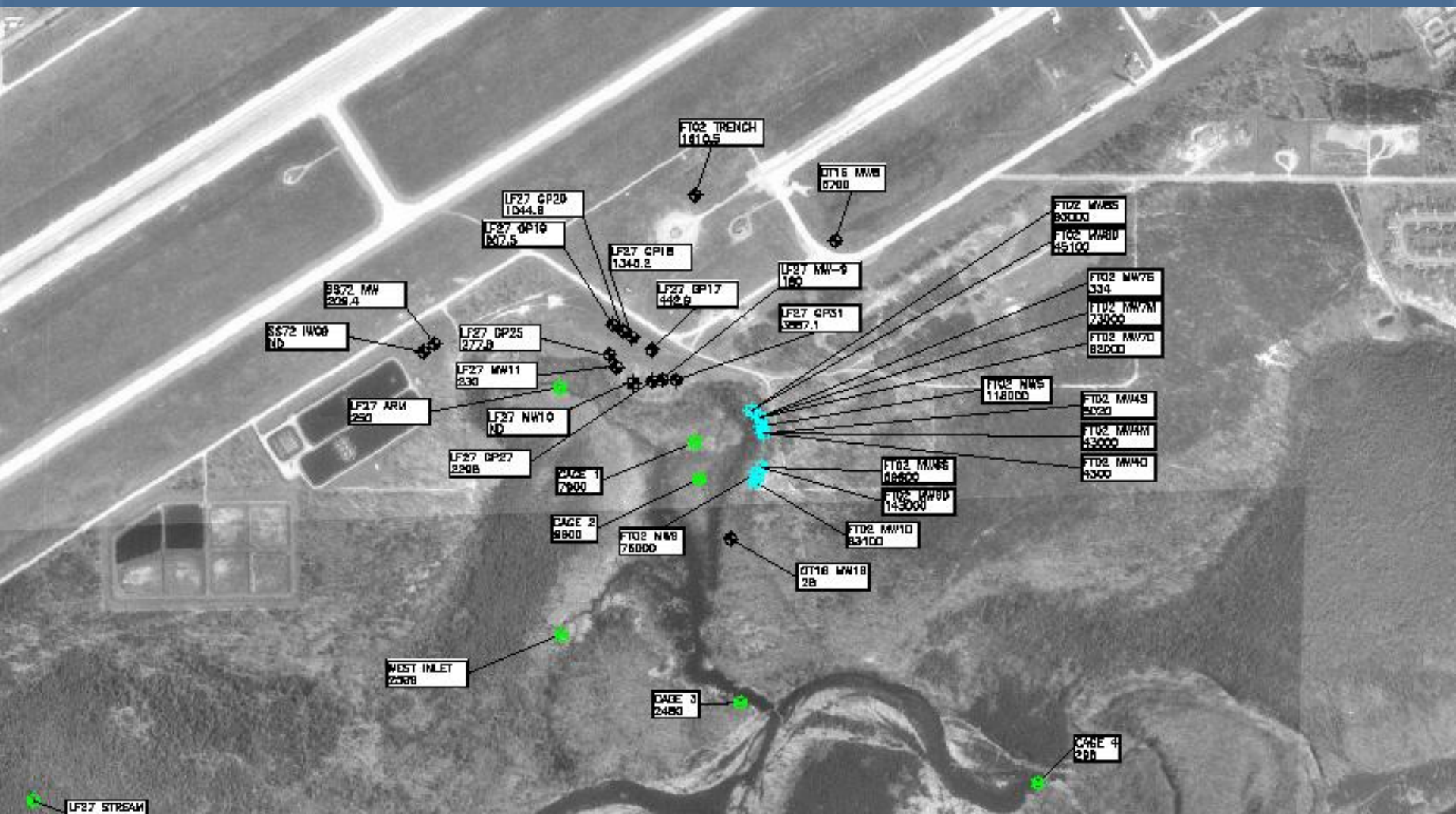
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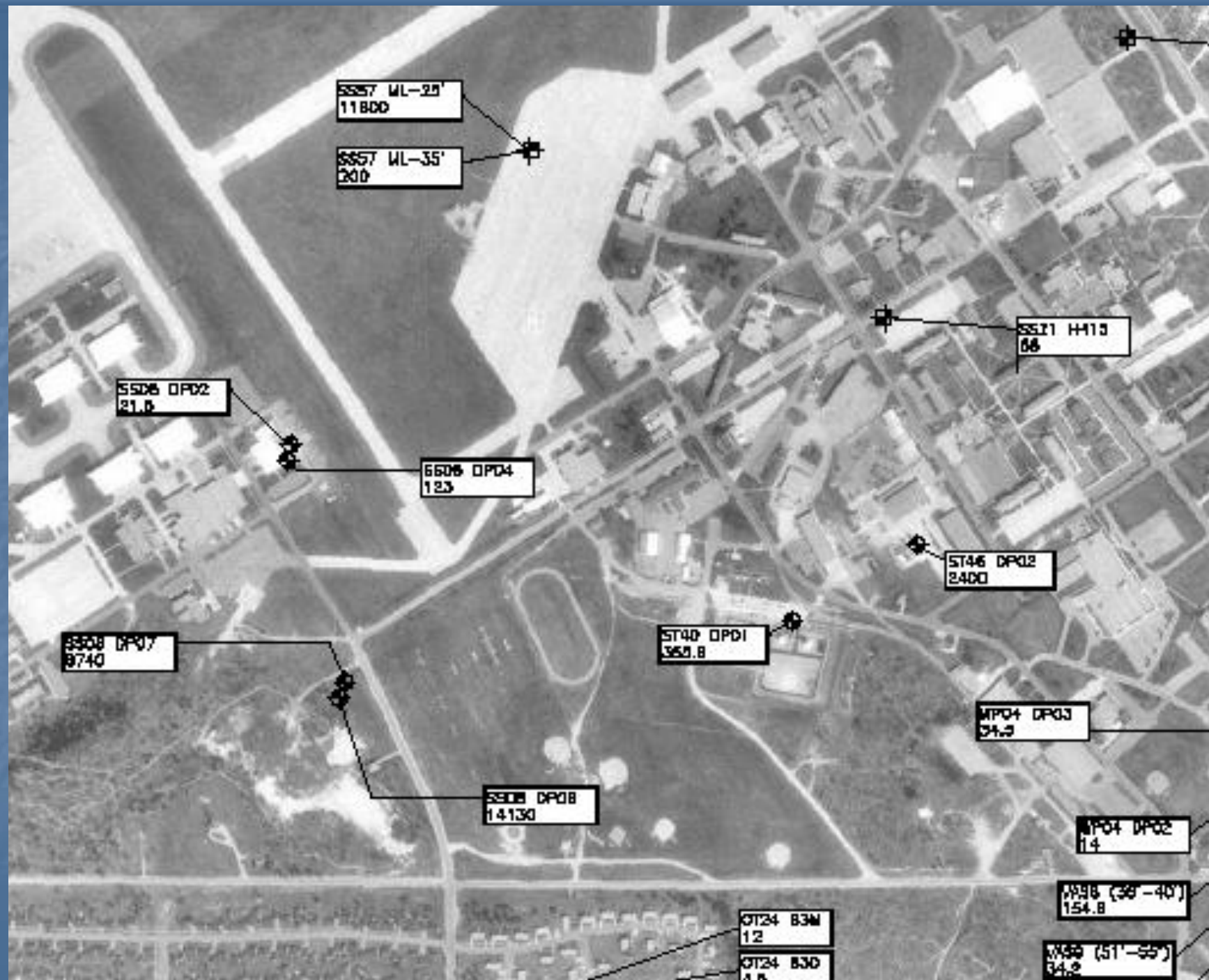
Designed: DWT 09/16/2011
Drawn: LAC 01/10/2013
Checked: DWT 11/20/2011
Approved: DWT

PROJECT NUMBER
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SHEET REFERENCE NUMBER

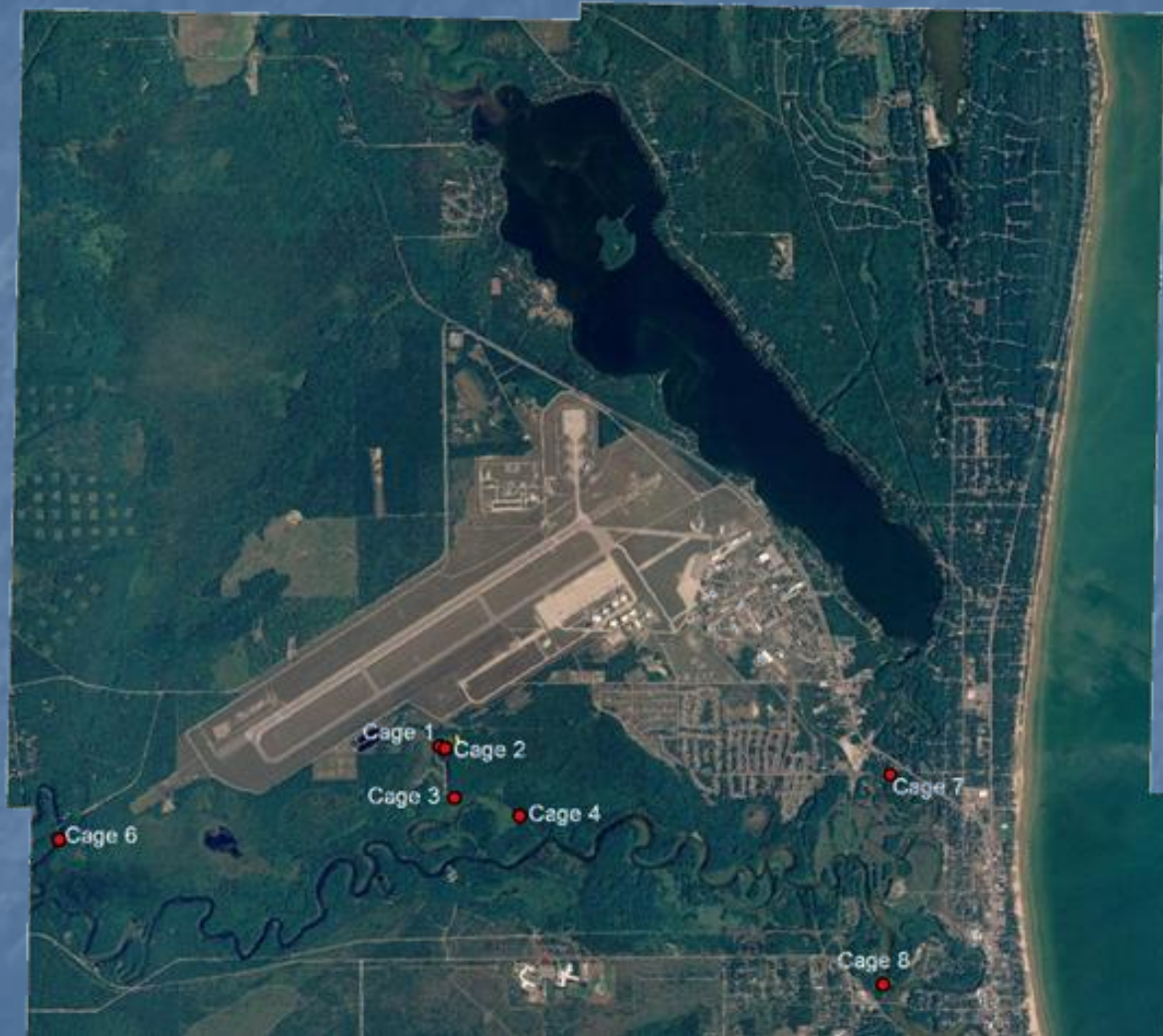
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SHEET 03 OF 03





● Cage 5



PFOS and PFOA in Groundwater at the Fire Training Area

- Groundwater PFOS - 16 samples ranging from 0.26 ppb to 110 ppb
- Groundwater PFOA – 16 samples ranging from 0.074 ppb to 33 ppb

Implications for Wurtsmith Remedial Actions

- Groundwater, surface water and sediments are impacted with PFCs over a large geographic area
- We expect to find it at many more locations
- Existing risk assessments for the base did not account for impacts of PFCs



Implications for Wurtsmith Remedial Actions (cont.)

- PFC contamination is being redirected to surface water bodies through remedial treatment systems
- Exposure to humans through contact with surface water and sediments
- Impact to biota around the base



Implications for Wurtsmith Remedial Actions (cont.)

- Likely exposure to the public through contaminated fish
- Historically PFOS and PFOA impacted drinking water at the base for years
- Public trust is a significant issue for all agencies involved in the cleanup at Wurtsmith

Implications for Wurtsmith Remedial Actions (cont.)

- None of the existing remedies are effective at treating groundwater for PFCs
- Off base groundwater is impacted with PFCs
- Drinking water is impacted off base

Implications for the Rest of the State

- We expect to find very similar problems at other military bases around the state
- Traditional water and waste water treatment technologies do not remove PFC and in fact some processes concentrate the PFCs

Conclusions

- PFCs are going to be a problem environmentally, technically and financially for us all
- Military may play a major role in how we address PFCs as a nation
- Virtually every base will be impacted by PFCs